DIFFERENTIAL RESISTANCE TO BACTERIAL INFECTION OF TWO POPULATIONS OF THE EUROPEAN ABALONE *HALIOTIS TUBERCULATA* AGAINST THE BACTERIUM *VIBRIO HARVEYI*.

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ABSTRACT

Since 1997, populations of the European abalone *Haliotis tuberculata* suffer mass mortalities attributed to the bacterium *Vibrio harveyi*. These mortalities typically coincide with the spawning season and when temperatures exceed 17 ° C, a temperature below which the bacterial proliferation is insufficient to cause damage to the abalone.

To study abalone resistance mechanisms, experimental infections were carried out on geographically distinct populations thought to have differential response to disease in the field. A first set of successive infections identified one resistant (11% mortality) and one susceptible (58% mortality) population. Two sets of successive infections were used to highlight the resistance mechanisms of this population: (1) to evaluate the immune state of the resistant population compared to a susceptible, and (2) to compare differences in global gene expression (RNA-Seq) of hemocytes in the resistant and susceptible populations.

While *in vivo* quantification of phagocytosis by flow cytometry showed strong inhibition following the first infection, inhibition of phagocytosis was less pronounced following the second infection, suggesting an immune priming effect. Fluorescent 3D microscopy (Vivatome) validated the capability of abalone hemocytes to phagocytose *V. harveyi*. *In vitro* analyses showed a significant negative impact of extracellular products of *V. harveyi* on phagocytosis. Furthermore, the RNA-Seq analysis showed 2956 transcripts (24, 9% annotated) with altered expression between the resistant and susceptible abalone populations following experimental infection. In the total annotated transcriptome, 288 transcripts were related to immune functions, including several F-type lectins, toll-like receptor, tumor necrosis factor and other immune genes of interest.

KEYWORDS

Immunity, hemocyte, transcriptomic, abalone, outbreak, extracellular products, priming, differential expression, *Vibrio harveyi*, flow cytometry

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